

FIG. 2

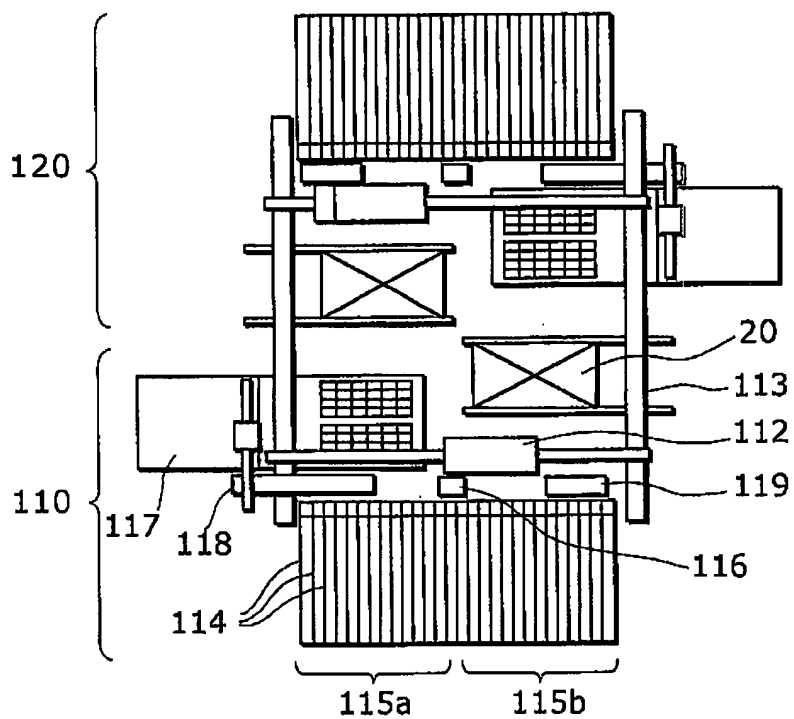


FIG. 3

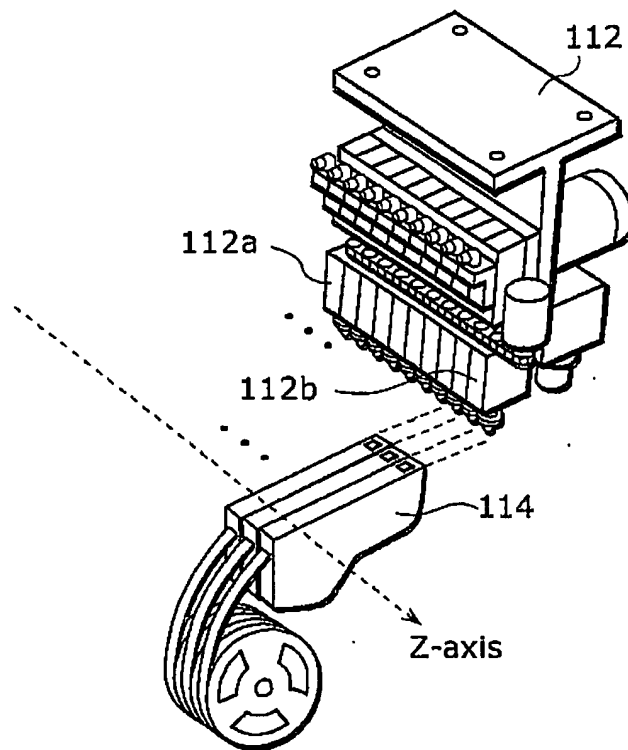


FIG. 4A

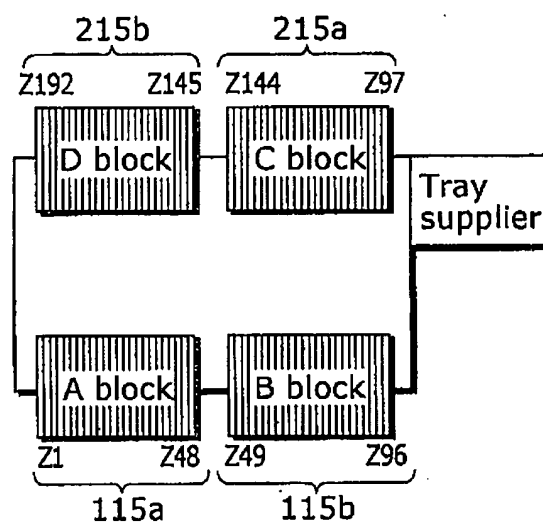


FIG. 4B

| Component cassettes | A | | | | | B | | | | | C | | | | | D | | | | | Occupied consecutive positions | | | | | | | |
|------------------------|---------------|----|-----|-----|-----|-----|------|------|------|-----------------|-----|-----|-----|-----|-----------------|-----|-----|------|------|-----------------|--------------------------------------|------|------|------|------|-----------------|-----|---|
| | Tape width | Z1 | Z48 | Z49 | Z96 | Z97 | Z144 | Z145 | Z192 | No. of tapes | Z49 | Z51 | Z93 | Z95 | No. of tapes | Z97 | Z99 | Z141 | Z143 | No. of tapes | | Z145 | Z147 | Z189 | Z191 | No. of tapes | | |
| | 8(Double) | O | O | O | O | O | O | O | O | O | O | O | O | O | O | O | O | O | O | O | O | O | O | O | O | 48 | 192 | 1 |
| | 8(Single) | O | O | O | O | O | O | O | O | O | O | O | O | O | O | O | O | O | O | O | O | O | O | O | O | 24 | 96 | 1 |
| | 12 | O | O | O | O | O | O | O | O | O | O | O | O | O | O | O | O | O | O | O | O | O | O | O | O | 24 | 96 | 1 |
| | 16 | O | O | O | O | O | O | O | O | O | O | O | O | O | O | O | O | O | O | O | O | O | O | O | O | 12 | 48 | 2 |
| | 24 | O | O | O | O | O | O | O | O | O | O | O | O | O | O | O | O | O | O | O | O | O | O | O | O | 12 | 48 | 2 |
| | 32 | O | O | O | O | O | O | O | O | O | O | O | O | O | O | O | O | O | O | O | O | O | O | O | O | 12 | 48 | 2 |
| | 44 | - | O | O | - | 8 | - | O | O | - | 8 | - | O | O | - | 8 | - | O | O | - | 8 | - | O | O | - | 8 | 32 | 3 |
| | 56 | - | O | O | - | 6 | - | O | O | - | 6 | - | O | O | - | 6 | - | O | O | - | 6 | - | O | O | - | 6 | 24 | 4 |
| 72 | - | O | O | - | 6 | - | O | O | - | 6 | - | O | O | - | 6 | - | O | O | - | 6 | - | O | O | - | 6 | 24 | 4 | |

FIG. 5A

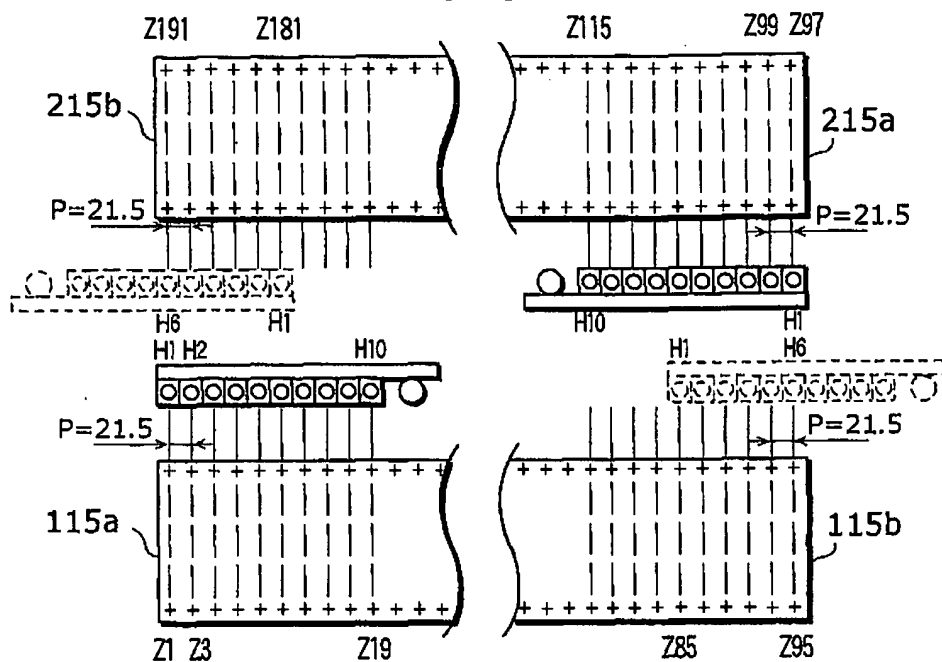


FIG. 5B

| 10 nozzle heads | Inner side | Z1 | Z3 | Z5 | Z7 | Z9 | Z11 | Z13 | Z15 | Z17 | Z19 ~ Z86 | Z87 | Z89 | Z91 | Z93 | Z95 |
|-----------------|------------|----|----|----|----|-----|-----|-----|-----|-----|-------------------|------|------|------|------|------|
| | Outer side | Z2 | Z4 | Z6 | Z8 | Z10 | Z12 | Z14 | Z16 | Z18 | Z115 ~ Z182 | Z183 | Z185 | Z187 | Z189 | Z191 |
| Heads (Nozzles) | H1 | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | — | — | — | — | — |
| | H2 | — | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | — | — | — | — |
| | H3 | — | — | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | — | — | — |
| | H4 | — | — | — | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | — | — |
| | H5 | — | — | — | — | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | — |
| | H6 | — | — | — | — | — | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | H7 | — | — | — | — | — | — | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | H8 | — | — | — | — | — | — | — | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | H9 | — | — | — | — | — | — | — | — | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | H10 | — | — | — | — | — | — | — | — | — | ○ | ○ | ○ | ○ | ○ | ○ |

○ : Picking up possible
 — : Picking up impossible

FIG. 6A

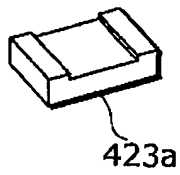


FIG. 6B

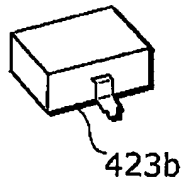


FIG. 6C

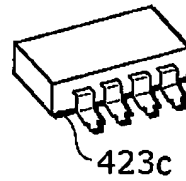


FIG. 6D

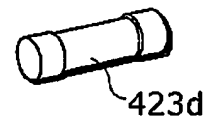


FIG. 7

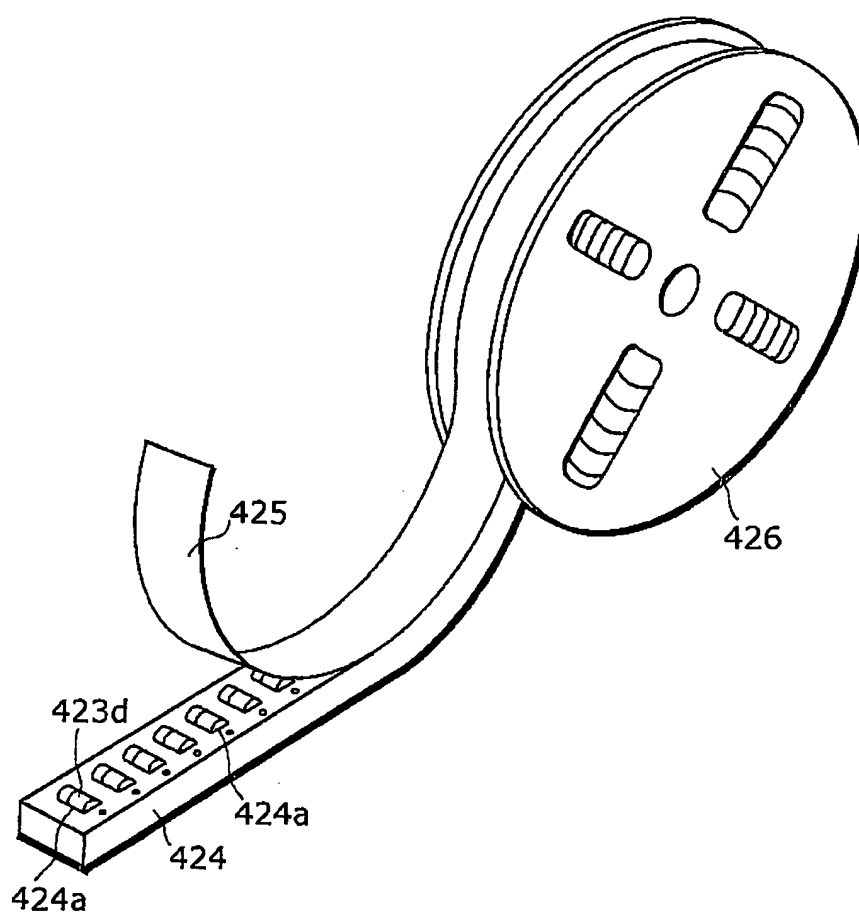
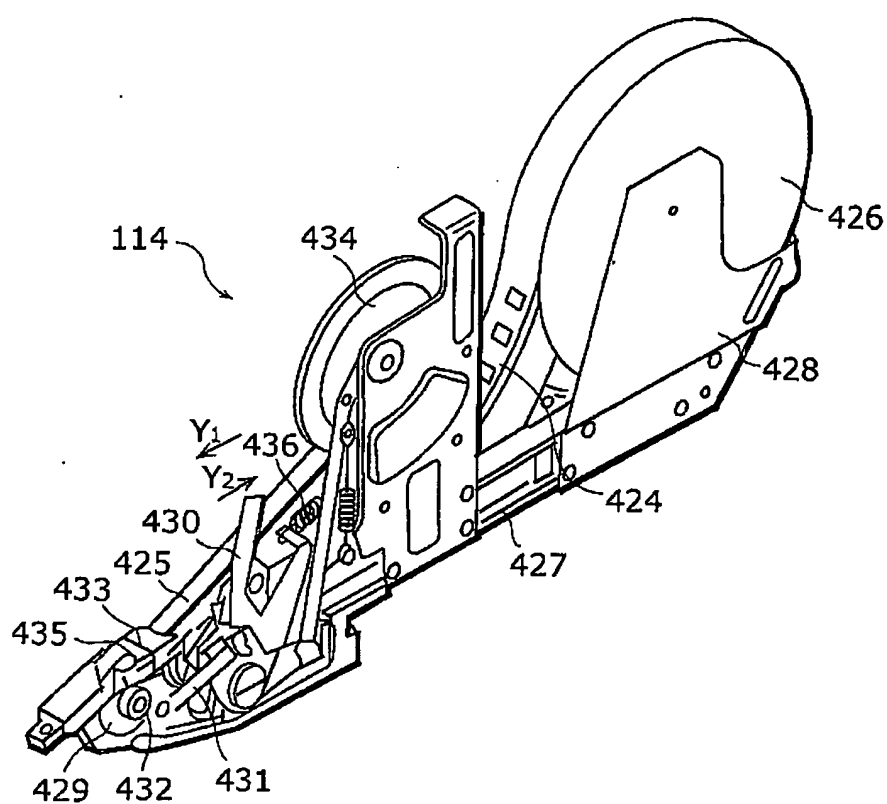


FIG. 8



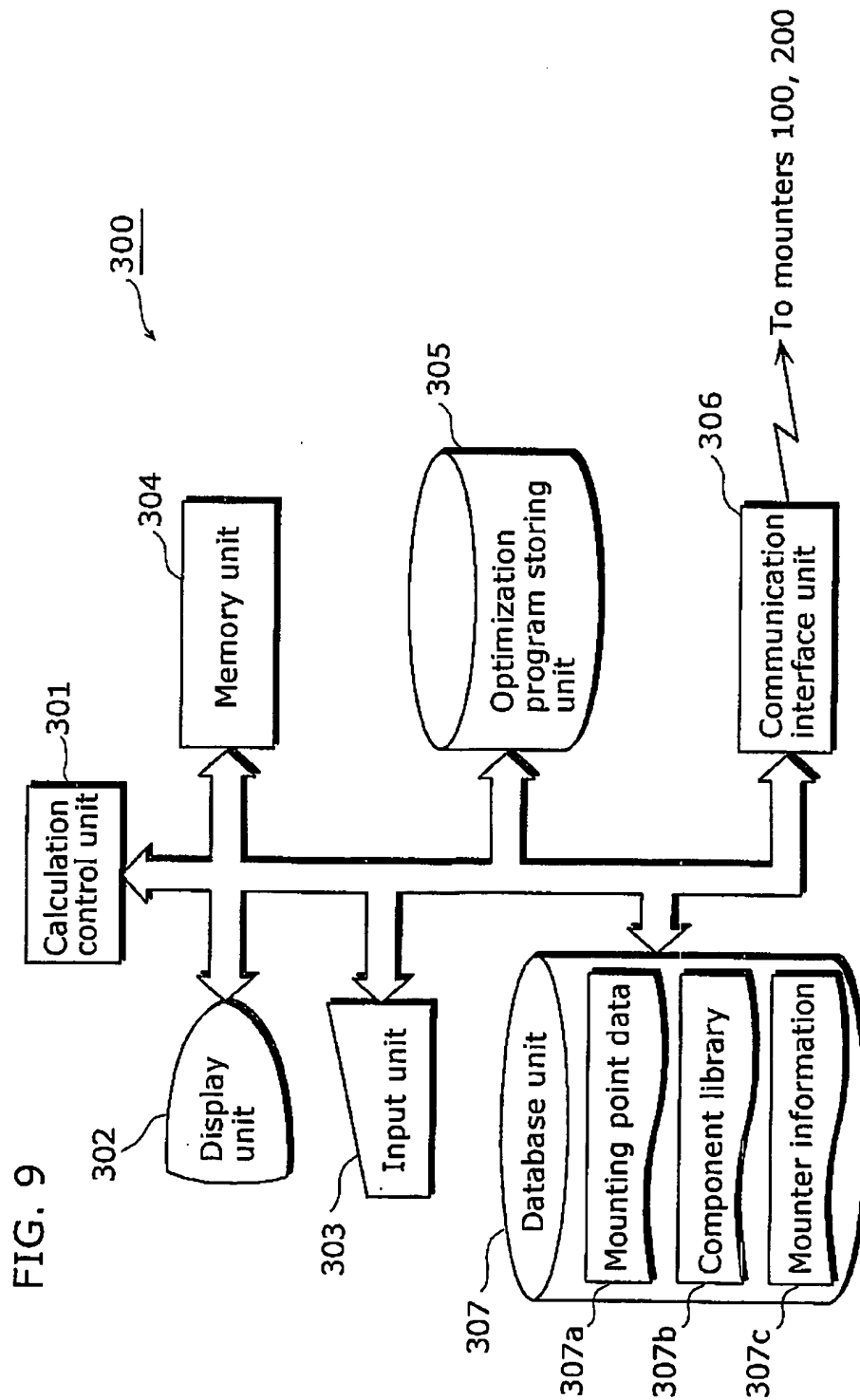



FIG. 10

 307a

Mounting points $p_i = (\text{Component type } C_i, \text{ X coordinate } X_i, \text{ Y coordinate } Y_i, \text{ Mounting angle } \theta_i, \text{ Control data } \phi_i)$



NC data is a list of mounting points p_i

$$\text{NC data} = \begin{pmatrix} p_1 \\ p_2 \\ p_3 \\ \vdots \\ \vdots \\ \vdots \\ p_N \end{pmatrix} = \begin{pmatrix} c_1, x_1, y_1, \theta_1, \phi_1 \\ c_2, x_2, y_2, \theta_2, \phi_2 \\ c_3, x_3, y_3, \theta_3, \phi_3 \\ \vdots \\ \vdots \\ \vdots \\ c_N, x_N, y_N, \theta_N, \phi_N \end{pmatrix}$$

FIG. 11

307b










| Component name | (Appearance) | Component size (mm) | | | 2-D recognition method | Pick-up nozzle | Tact time (sec.) | Speed XY | |
|----------------|---|---------------------|------|---------|------------------------|-----------------|------------------|----------|------|
| | | X | Y | L | | | | | |
| 0603CR |  | 0.6 | 0.3 | 0.25 | Reflection | SX | 0.086 | 1 | |
| 1005CR | | 1.0 | 0.5 | 0.3-0.5 | | SA | | | |
| 1608CR | | 1.6 | 0.8 | 0.4-0.8 | | S | 0.094 | | |
| 2012CR | | 2.0 | 1.25 | 0.4-0.8 | | | | | |
| 3216CR | | 3.2 | 1.6 | 0.4-0.8 | | | | | |
| 4TR |  | 2.8 | 2.8 | 1.1 | | Cylindrical tip | 0.11 | | |
| 6TR |  | 4.3 | 4.5 | 1.5 | | | | | |
| 1TIP |  | 2.0 | φ1.0 | - | | | | | |
| 2TIP | | 3.6 | φ1.4 | - | | | | | |
| 1CAP |  | 3.8 | 1.9 | 1.6 | | S | 0.13 | 2 | |
| 2CAP | | 4.7 | 2.6 | 2.1 | | | | | |
| 3CAP | | 6.0 | 3.2 | 2.5 | | | | | |
| 4CAP | | 7.3 | 4.3 | 2.8 | | | | | |
| SCAP |  | 4.3 | 4.3 | 6.0 | | M | | | |
| LCAP | | 6.6 | 6.6 | 6.0 | | ML | | | |
| LLCAP | | 10.3 | 10.3 | 10.5 | | | | | |
| 1VOL |  | 4.5 | 3.8 | 1.6-2.4 | | M | | | 0.13 |
| 2VOL |  | 3.7 | 3.0 | 1.6 | | | | | |
| 3VOL |  | 4.8 | 4.0 | 3.0 | | | | | |
| | | | | | | | | | |

FIG. 12

307c

| Unit ID | Head information | Nozzle information | Cassette information | Tray information |
|---------|------------------|--------------------|----------------------|------------------|
| 110 | 10 nozzle heads | SX,SA,... | 96 | 8 levels |
| 120 | 10 nozzle heads | None | 96 | None |
| 210 | 4 nozzle heads | S,M,... | 48 | None |
| | | | | |

FIG. 13

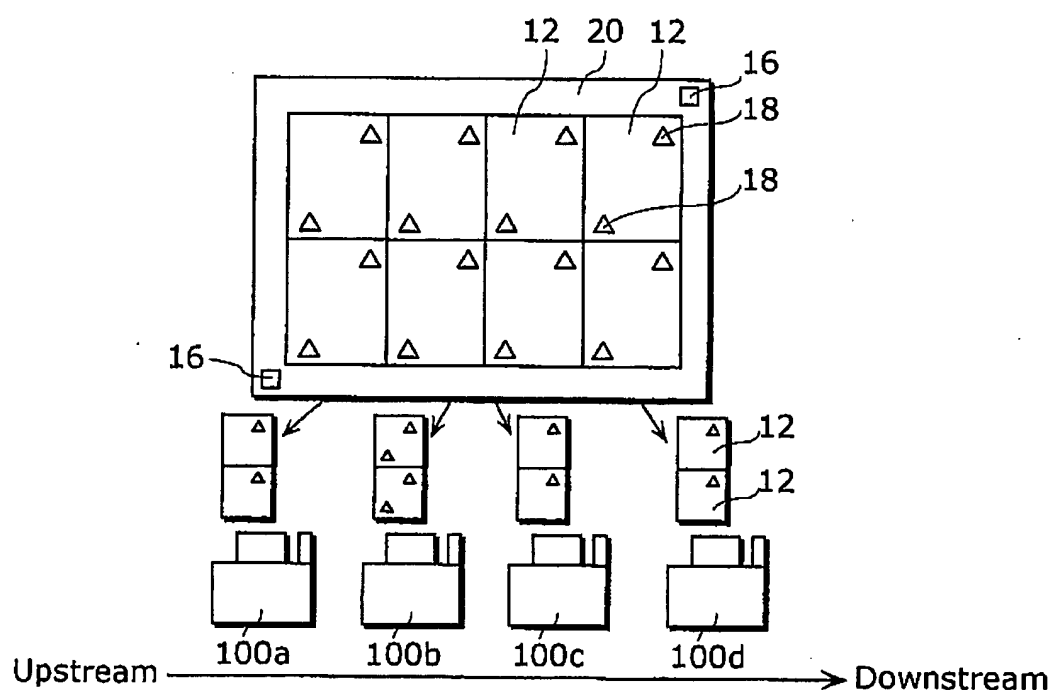


FIG. 14

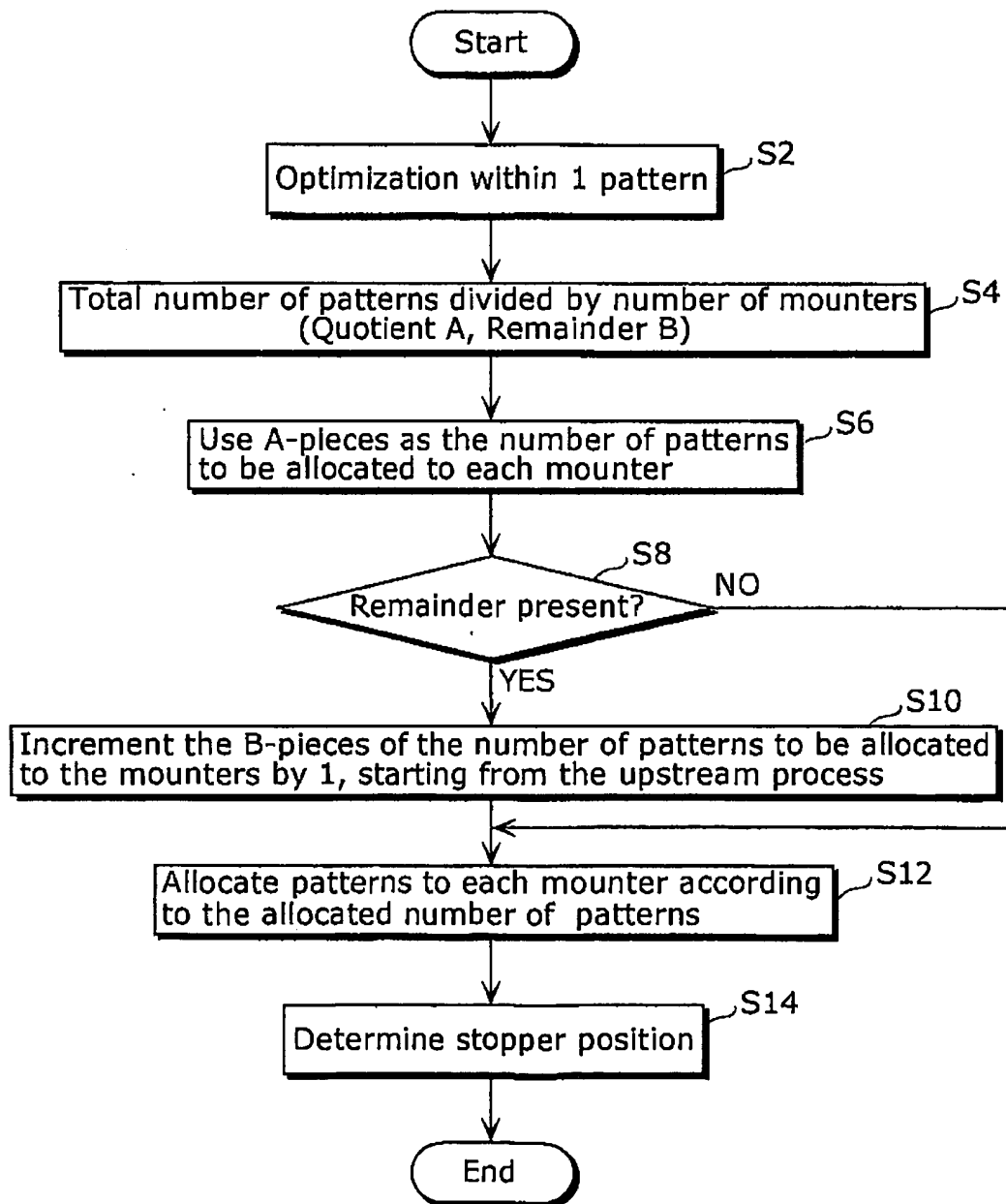


FIG. 15

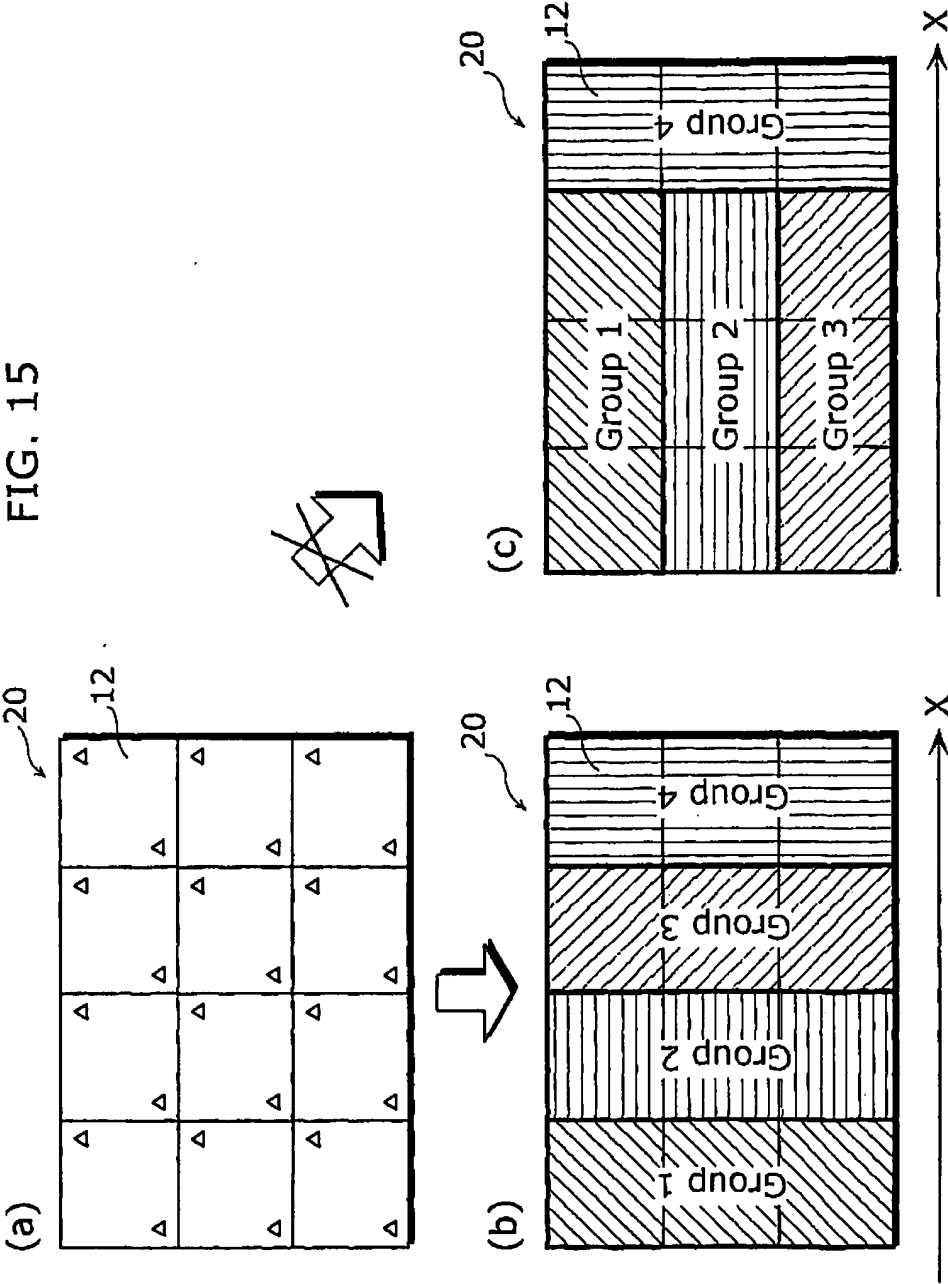


FIG. 16

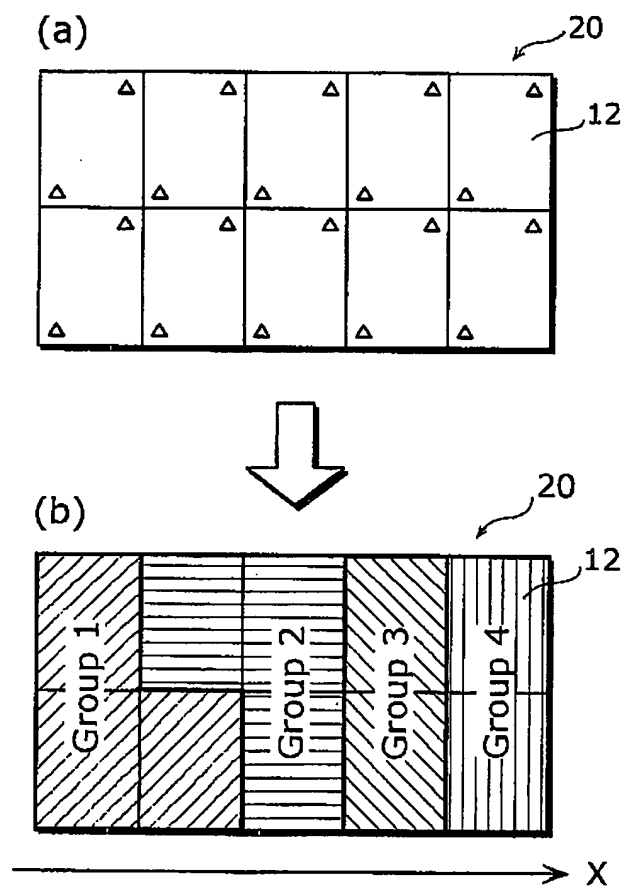


FIG. 17B

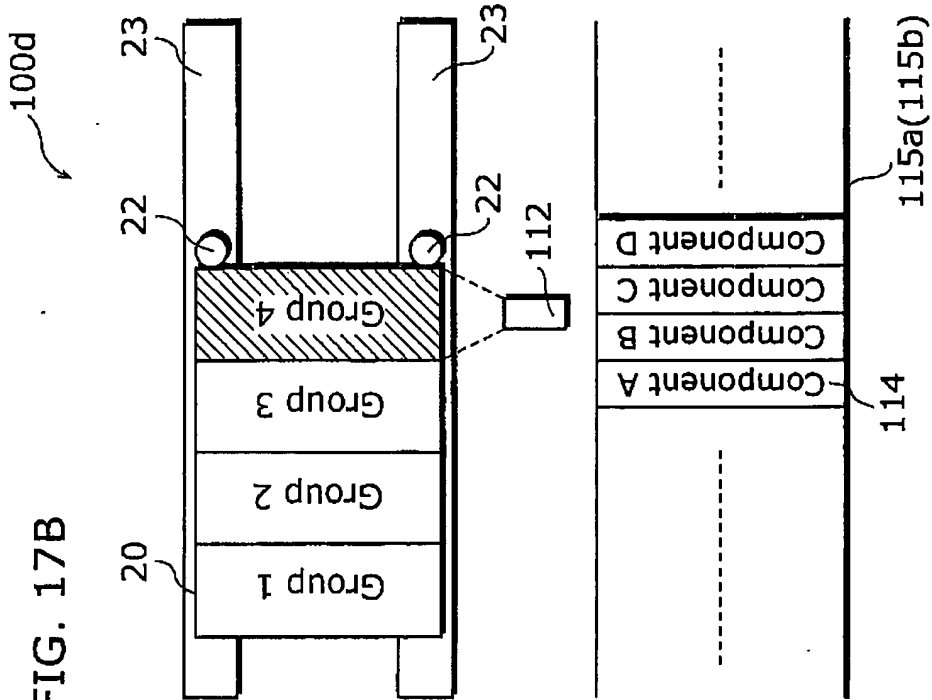
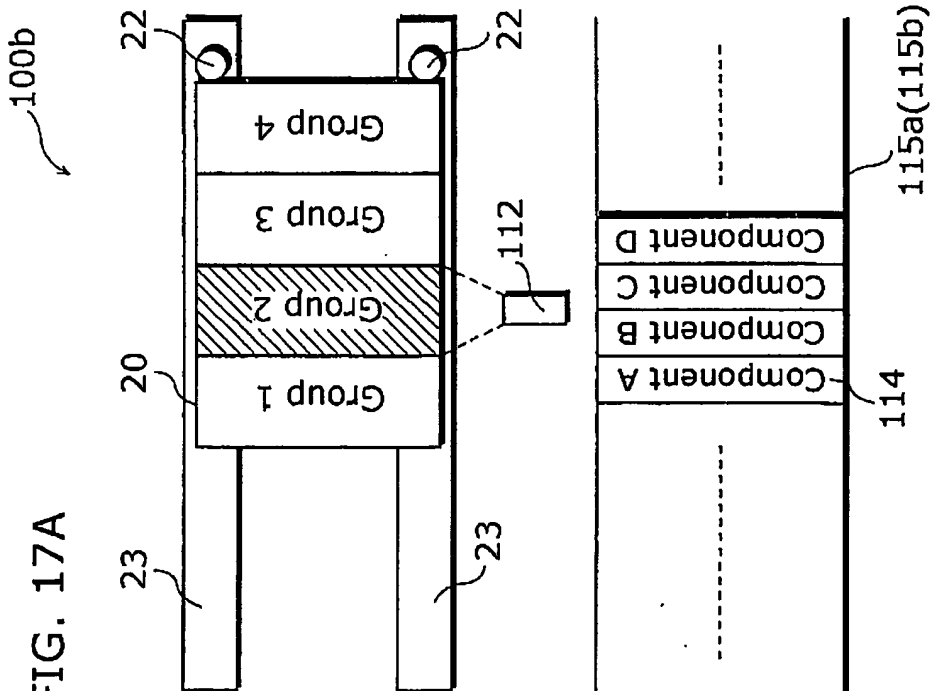
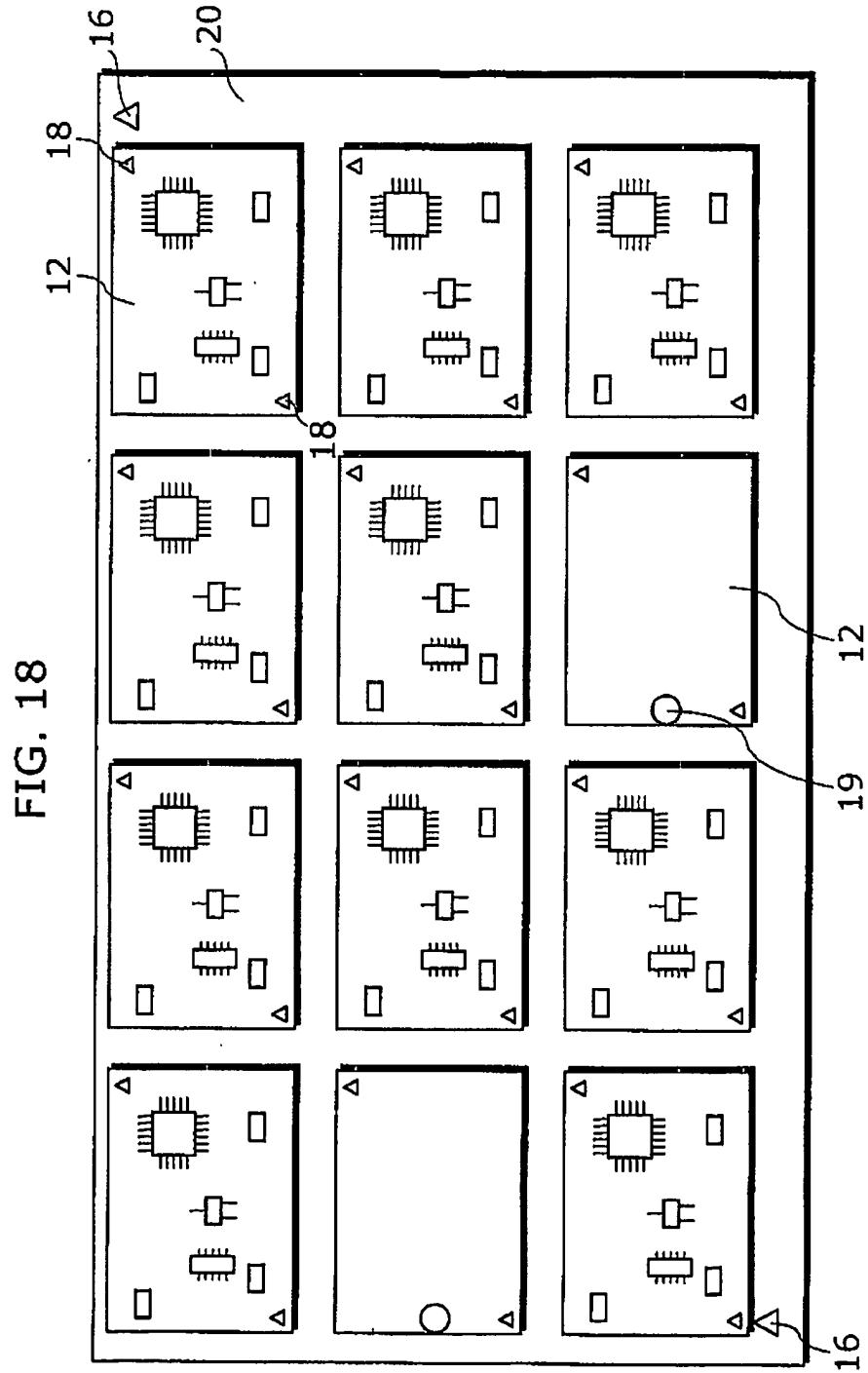


FIG. 17A





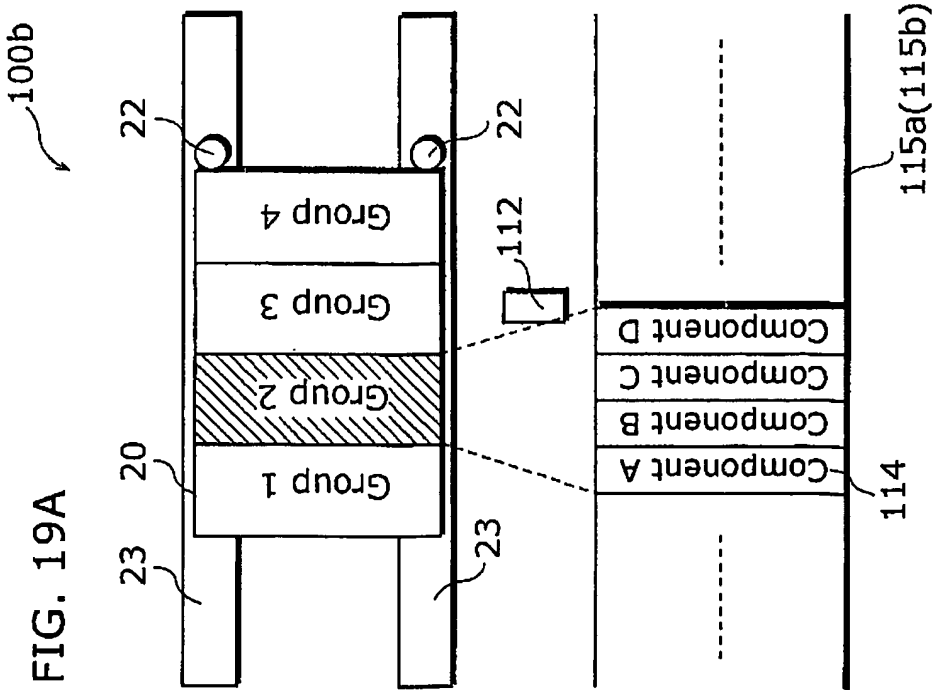
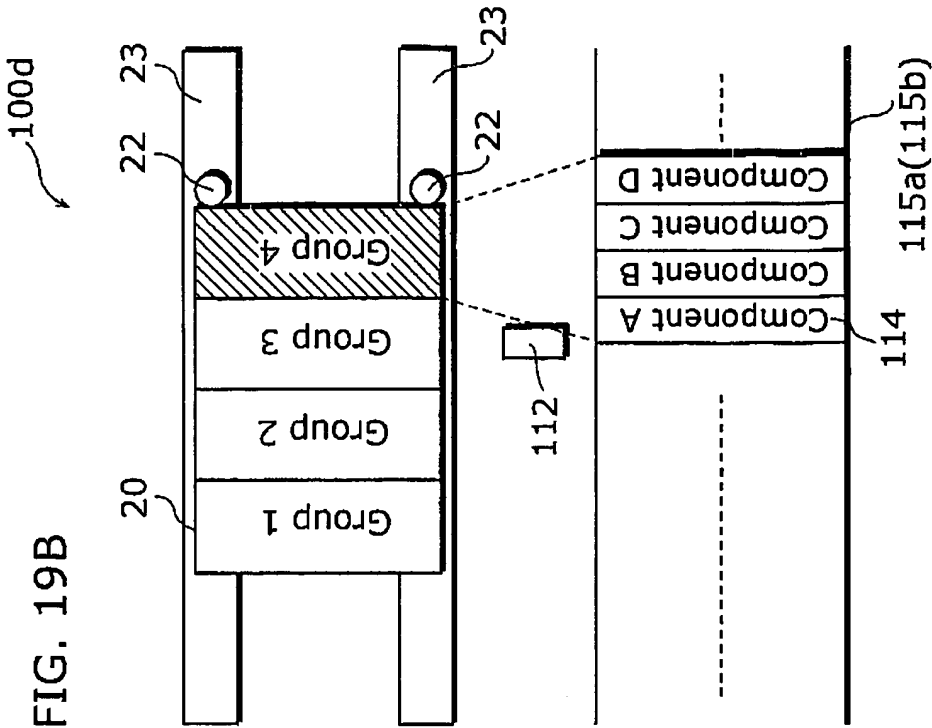


FIG. 20

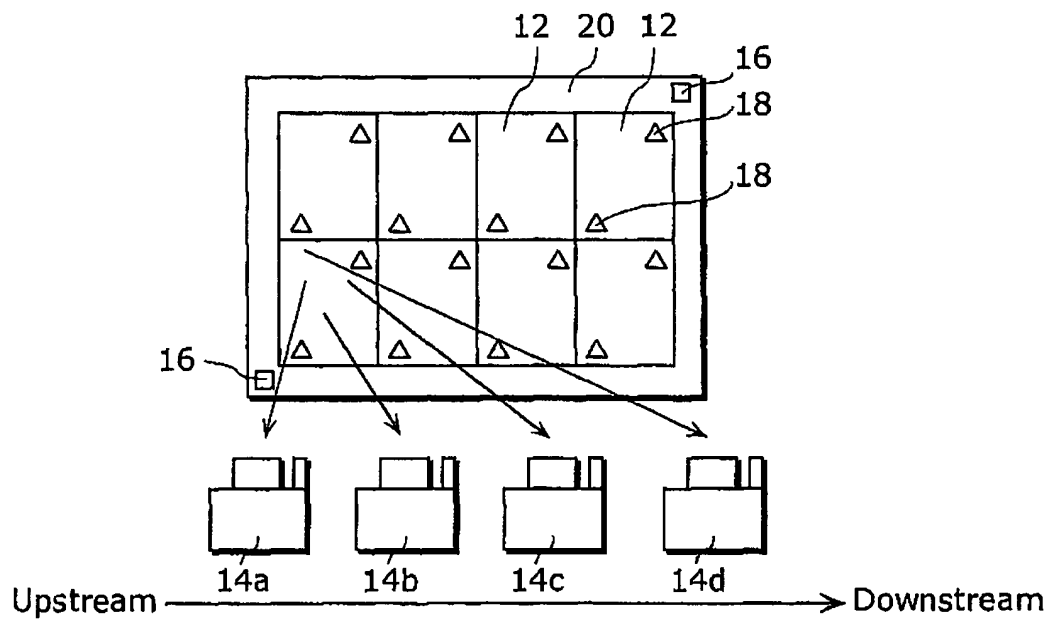


FIG. 21

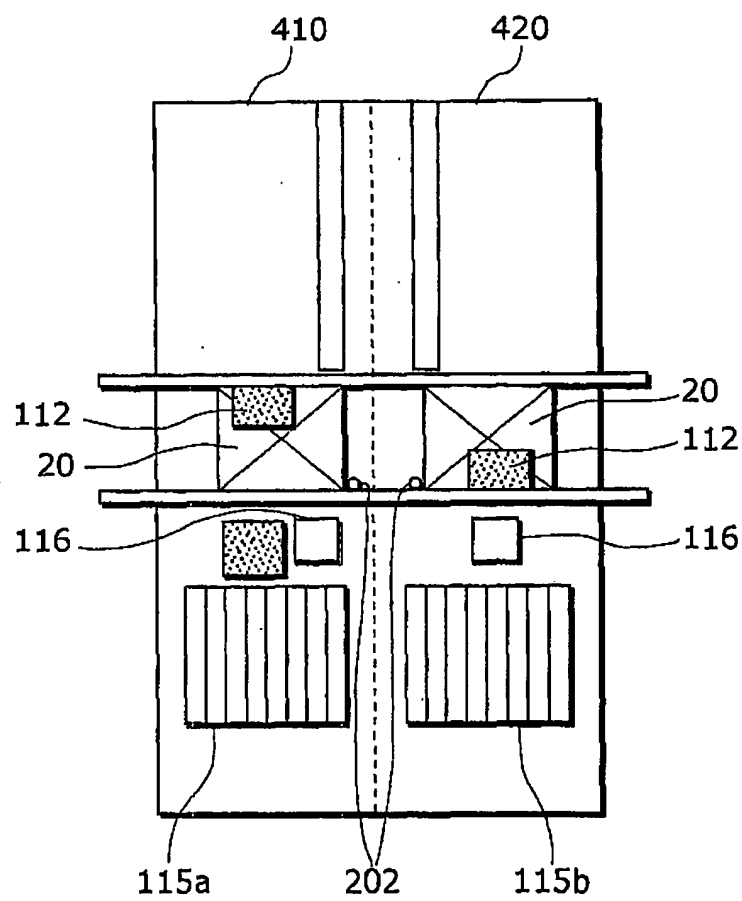


FIG. 22

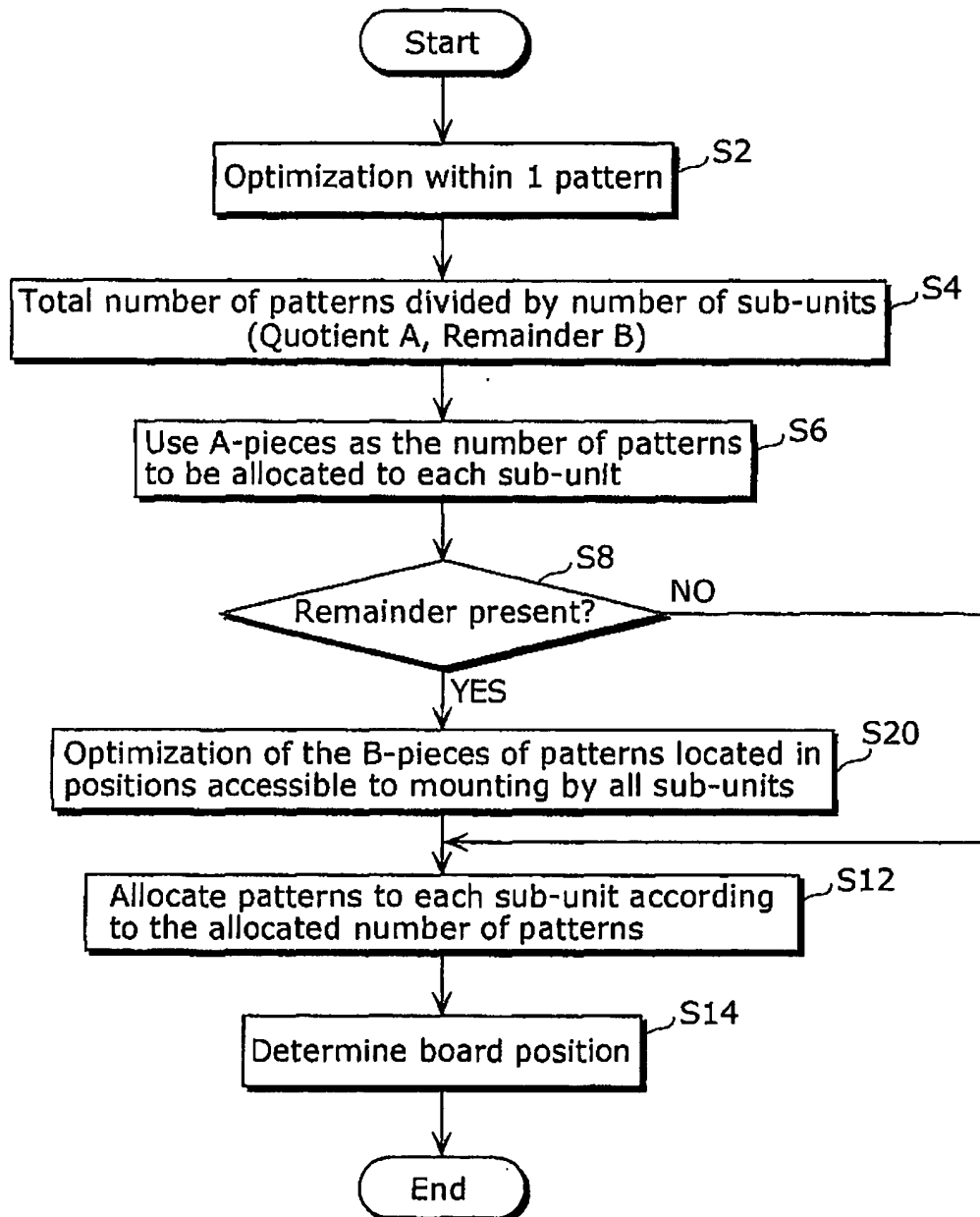


FIG. 23

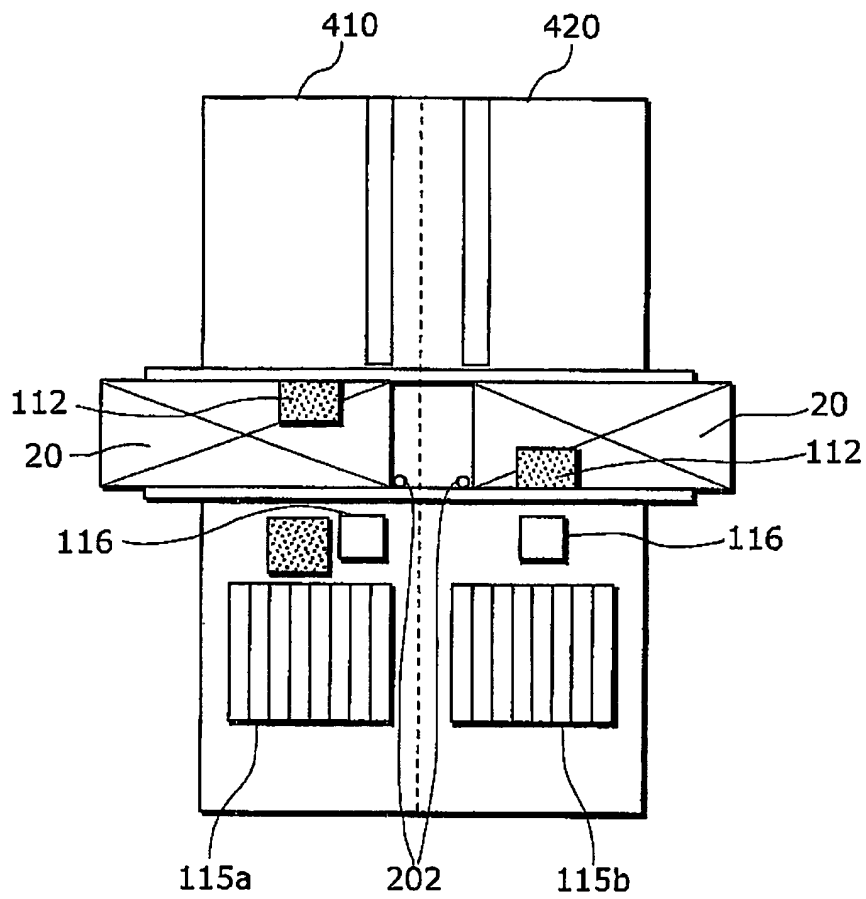


FIG. 24

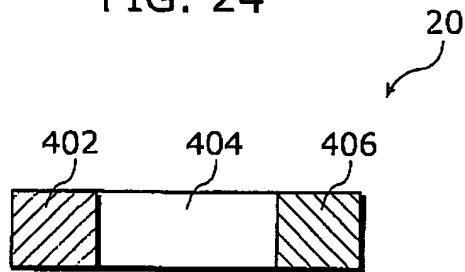


FIG. 25

